Investigating the Impact of Tumor Biology and Social Determinants on Time to Diagnosis and Stage at Presentation of Wilms Tumor

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Background:
- Socioeconomic factors affect overall survival of pediatric cancers
- Patients with metastasis have worse prognosis
- Tumor biology also plays a role
- Interplay between tumor biology and socioeconomic factors important in cancer diagnosis and treatment
- Leads to question of whether time to diagnosis and delay in diagnosis can be used interchangeably?

Hypothesis:
Time to diagnosis is a function of tumor biological aggressiveness, while delays in diagnosis make tumors more likely to present at a higher stage

Methods:
- 306 charts reviewed from Children’s Hospital Colorado
  - Patient barriers identified from social work notes and doctor’s notes
  - Initial symptom to time of first medical visit and to date of diagnosis noted
  - Staging at diagnosis
  - Histology and LOH at time of diagnosis used as proxy for tumor biology
  - Multivariable logistic regression

Results:

<table>
<thead>
<tr>
<th>Stage at diagnosis vs. patient barriers</th>
<th>No statistically significant results</th>
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<tbody>
<tr>
<td>Patient barriers vs. time to diagnosis from initial symptom</td>
<td>Patients whose family faced housing concerns were more likely to be diagnosed greater than or equal to 9 days from the onset of symptoms compared to those who had no housing concerns (OR 10.37, 90% CI 1.18-91.31, P=0.077). Patients with Medicaid were more likely to be diagnosed in greater than or equal to 9 days compared to those with private insurance (OR 2.09, 90% CI 0.94-6.63, P=0.129), while those who were uninsured were more likely to be diagnosed in 9 or more days from first symptom (OR 0.10, 90% CI 0.01-1.19, P=0.126)</td>
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Tumor biology vs stage
- Patients who had unfavorable histology/unknown were more likely to be diagnosed at stage 3 or 4 (OR 6.17, 90% CI 2.81-13.55, P<0.001) relative to those with favorable histology.
- When estimating the odds of patients being diagnosed at stage 3 or 4 versus 1 or 2, patients with LOH had increased odds compared to those with no or unknown LOH (OR 1.86, 90% CI 0.91-3.80, P=0.153). Although this was not statistically significant, it was approaching significance at the level of P<0.01.

Discussion:
- Social factors are more associated with symptoms and timing to medical care and diagnosis
  - Housing concerns may take precedence over health concerns leading
    - Medicaid and uninsured status may lead to increased time due to increased wait times for appointments or finding a doctor that takes Medicaid
- Tumor biology is more associated with stage than with timing of diagnosis
  - The interplay between tumor biology, patient barriers, staging, and timing of diagnosis is more complex than our hypothesis

Future directions:
- Multiple study sites for larger sample size
- Ultimately interviewing patients rather than using chart as proxy for patient barriers
- Further investigation into tumor biomarkers for other cancers

Conflicts of Interest:
There are no conflicts of interest

References: